tures in the two screens are identical, but the range of temperature in the small screen is 1.7° larger; that is to say, its maximum temperatures are 0.9° too high and its minimum temperatures 0.9 too low. Consequently, the larger screen is adopted as the standard. It is a single-louvred wooden screen, whose dimensions are 8 by 8 by 8 feet. This is about the size of the double-louvred screen used by the Weather Bureau at Washington, D. C., in 1870–1881, but afterwards replaced, in 1885, by the single-louvred screen, 3 by 3 by 3 feet.

As climatological studies of different parts of the world are very much affected by differences in the exposure of instruments and the methods of treating their indications, we need only call attention to the fact that Mr. Sutton deduces the dew-points from the readings of the wet and dry bulb by the use of Glaisher's Greenwich factors, a process that seems to us inappropriate to his dry climate, and by which he must, necessarily, lose much of the accuracy attainable in consideration of the great care that he has taken to give his wet and dry bulbs the proper exposure and treatment. However, he expresses the hope that he will be able to make a series of comparative observations of the dew-point with a Dine's hygrometer. As this has already been done by many others, he will doubtless be led to the same results as they, for there can be no doubt but what the ventilated psychrometer, either whirled or aspirated, is the only instrument comparable with the dew-point apparatus for convenience and accuracy.

We are much interested to notice that Mr. Sutton's experience is not favorable to the minimum thermometer exposed on the grass. In fact, this has long since been discarded by physicists as a means of indicating the intensity of sunshine, and can have little or no definite relation to the temperature of the grass. If solar radiation is to be measured, either absolutely or relatively, one must use the dynamic, and not the static, method. It matters not whether we use a black bulb *in vacuo* or the pyrheliometer of Pouillet, or that of Crova, or Violle, or Angström, or Chwolson, in every case the details of the apparatus are no more important than the method of using it, which must always be by alternate shading and exposing of about one minute each, or even less, and reduction by the proper formula. The only apparent exception to this rule is the newest electric pyrheliometer of Angström, but this is really for comparative, not absolute measurements.

Mr. Sutton admirably sums up the relative merits of the Campbell-Stokes burning recorder and the Jordan photographic recorder as used for the purpose of continuous register of the simple clearness and cloudiness of the sky. It would seem that the honors are about equally divided, and we would suggest that Professor Marvin's thermometric sunshine recorder be set up beside the other two, in the dry hot climate of Kenilworth.

Hydraulic engineers will be glad to avail themselves of the observations by Mr. Sutton on the subject of evaporation and its relation to rainfall. He has 6 rain gages within an area of 400 square miles, and says that it frequently happens that an inch or more of rain falls at one station without any rain at the others. The actual rain that falls into the tank is given for every hour of the year, as also the monthly totals of evaporation. The record was kept continuously by the auxanometer, constructed by the Cambridge Scientific Instrument Company. Observations were also taken regularly with the Piche evaporometer and the Pickering evaporator.

The approximate location of the Kenilworth observatory is, longitude, 24° 27′ E.; latitude, 28° 42′ S.; altitude, about 3,950 feet.

FROST WORK IN SOUTH AFRICA.

Among the interesting notes relating to rare meteorological phenomena in South Africa, we quote the following from the Annual Report for 1898, page 136:

An interesting phenomenon, apparently rare in South Africa, was observed during August, 1896, at Qachas Nek, in Basutoland, and reported by the assistant commissioner, H. R. Cartwright, to whom I am indebted for the following particulars, as well as for photographs of the same. Mr. Cartwright writes:

"I inclose a photo of some Japanese privet bushes covered with ice caused by a hard frost combined with a mist on August 5 last. The hedge was 10 feet high naturally, but by the spade standing alongside you will note that the height is less than half that amount, owing to the weight of ice on the branches. The natives here say they have never seen such an occurrence before, though I seem to recollect it in England. Owing to the fog being very thick at the time I took the photo, it is not as clear as could be wished."

From his reply to a letter asking a number of questions on the subject, it appears that a smooth and transparent coating of ice, about three-fourths of an inch thick, was deposited only on the windward (southeast) side of trees, branches, posts, etc., but none on the ground. There was no fall of hail, sleet, or snow, either before or after the occurrence. No definite time could be given for its first appearance, but there was no icy deposit at dusk on the 5th. Fog prevailed all day on the 5th, all that night, and up to 6 p. m. on the 6th. The deposit was first seen at 8 a. m. on August 6, and it began to thaw and drop off about 10 a. m. The privet bush was not broken, owing to its pliant branches, but several blue gums in the garden had about 5 or 6 feet of their tops broken off. The station is situated on the Drakensberg watershed, at an elevation of 7,150 feet, and faces almost due north. The readings, taken at 8 a. m. on the 6th, were: Dry bulb, 33°; wet bulb, 33°; minimum, 31°; rainfall (most probably a deposit from the fog or mist), 0.05 inch. One photograph shows the tall, slender branches bent completely over, so that their tops are touching the ground, and the other shows the bush in its natural condition from about the same point of view, the heights of the branches in both cases being contrasted with a spade 3 feet in length.

This phenomenon is comparatively common along the hedgerows in England, but is seen in much exaggerated form at high mountain stations, such as those on Mont Blanc and Ben Nevis, where the deposit, called fog crystals, is frequently 18 inches to 2 feet thick. It seems to be due to the watery particles of a drifting fog or mist being solidified into ice on coming into contact with a solid body.

On mountain tops this frostwork is a very common phenomenon, both in Europe and in the United States. Abundant illustrations of its occurrence on Mount Washington and Pikes Peak were published in the early days of the Weather Bureau, and similar cases have since then been noted on the summits of Säntis, Ben Nevis, and other mountains that have been occupied by meteorological stations; but certainly no one expected a case of this kind in Africa, in latitude 29° south, even at an elevation of 7,000 feet. The explanation above given is that which has been generally accepted, viz, that the moisture in the atmosphere has already condensed by the lowering of temperature into invisible small particles of ice or, possibly, spherules of water at a temperature below freezing; these, striking against any obstacle, accumulate on the windward side far more than on the leeward.

PROF. HENRY ALLEN HAZEN.

On the evening of Monday, January 22, 1900, Prof. Henry Allen Hazen, while riding rapidly on his bicycle, hastening to his night work at the Weather Bureau, collided with a pedestrian, and was dashed to the ground. After lying unconscious for twenty-four hours, he expired on the 23d.

Professor Hazen was born January 12, 1849, in Sirur, India, about 100 miles east of Bombay, the son of Rev. Allen Hazen, a missionary of the Congregational Church. He came to this country when ten years old and was educated at St. Johnsbury, Vt., and at Dartmouth College, where he was graduated in 1871. After this he removed to New Haven, Conn., and for four years subsequent was assistant in meteorology and physics under Prof. Elias Loomis. He was also privately associated with the latter in meteorological researches, and the preparation of many of the Contributions to Meteorology, published by Professor Loomis, some of which bear evidence of the reflex influence of the pupil on the teacher.

In the spring of 1881, when the present writer first saw